FIVE-YEAR REVIEW REPORT

THIRD FIVE-YEAR REVIEW REPORT
FOR
UNIVERSITY OF MINNESOTA ROSEMOUNT RESEARCH CENTER SITE

ROSEMOUNT
DAKOTA COUNTY
MINNESOTA

Prepared by:
United States Environmental Protection Agency
Region 5
Chicago, Illinois

Approved by:

Richard C. Karl, Director
for **Superfund Division**
U.S. EPA, Region 5

6/15/07
Date

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List Of Acronyms

ARARs	Applicable or Relevant or Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CHI	Cumulative Hazard Index
ESD	Explanation of Significant Differences
GUE	George's Used Electric Subsite
HRLs	Health Risk Limits
ICs	Institutional Controls
MCLs	Maximum Contaminant Levels
MDH	Minnesota Department of Health
MERLA	Minnesota Environmental Response and Liability Act
MPCA	Minnesota Pollution Control Agency
NCP	National Contingencies Plan
NPL	National Priorities List
PCBs	Polychlorinated Biphenyls
PE	Porter Electric Subsite
PPB	Parts per billion
PPM	Parts per million
RAL	Recommended Allowable Limit
RCRA	Resource Conservation and Recovery Act
RI/FS	Remedial Investigation and Feasibility Study
TDU	Thermal Destruction Unit
TSCA	Toxic Substances Control Act
UMRCC	University of Minnesota Rosemount Research Center
U.S. EPA	United States Environmental Protection Agency

UNIVERSITY OF MINNESOTA ROSEMOUNT RESEARCH CENTER SITE
Executive Summary

The remedy for the University of Minnesota Rosemount Research Center Site located in Rosemount, Minnesota included incineration of soils with high concentrations of PCBs, consolidation and capping of soils with lesser PCB contaminations in a fenced area, excavation and disposal in an off-site landfill of lead contaminated soil, and disposal of commingled lead and PCB contaminated soil in appropriate landfills. A groundwater pumpout system and a rural water supply system were also constructed. The site achieved construction completion with the signing of the Preliminary Closeout Report on June 29, 1994. This is the third five-year review for the University of Minnesota Rosemount Research Center Site. The trigger for this five-year review was the signature date of the second five-year review which was June 21, 2002.

The assessment of this five-year review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD) and the two Explanation of Significant Differences (ESDs) and that it remains protective of human health and the environment in the short term. The onsite threats posed by lead and PCB contaminated soils have been addressed and current groundwater cleanup goals for volatile organic compounds (VOCs) have been met.

The ROD documented the selection of Remedial Actions (RAs) for the soil operable unit (GUE, PE and UST subsites) and the ground-water operable unit (Burn Pit subsite). Operable Unit (OU) 1 consisted of contaminated groundwater from the Burn Pit subsite. Subsequent to the execution of the ROD, the soil operable unit was divided into two operable units: Operable Unit 2 (OU2) - soil contaminated by lead, copper and polychlorinated biphenyls (PCBs) from the GUE subsite, and Operable Unit 3 (OU3) - soil contaminated by PCBs from the GUE, PE, and UST subsites.

Overall, the site remedy is functioning as intended and is protective of human health and the environment in the short-term, however, in order for the remedy to be protective in the long-term, the following actions will need to be taken. A review of the protectiveness of the current groundwater cleanup goal for TCE will be performed after U.S. EPA Headquarters completes its national risk assessment. Effective ICs must be implemented and maintained. An Institutional Control Evaluation will be conducted by the University of Minnesota to evaluate the adequacy of the ICs to ensure they are functioning as intended and to ensure effective procedures are in-place for long-term stewardship at the Site. An Institutional Control Plan will be developed by U.S. EPA to incorporate the results of the University's IC evaluation activities and, if necessary, plan for additional IC activities such as implementing additional or corrective measures, along with developing a plan to ensure long-term stewardship of the Site that includes regular site inspections and maintaining, monitoring and certifying the ICs at the Site. A review of sampling which was performed for multiple areas in the vicinity of the Burn Pit subsite shall be performed to ensure that no additional actions are necessary in these areas. Finally, maintenance issues identified in the site inspection should be implemented.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: University of Minnesota Rosemount Research Center		
EPA ID *(from WasteLAN)*: MND98061378		
Region: 5	**State:** MN	**City/County:** Rosemount/Dakota

SITE STATUS	
NPL status: ☐ Final x Deleted ☐ Other (specify)	
Remediation status (choose all that apply): ☐ Under Construction ☐ Operating x Complete	
Multiple OUs?* ☒ YES ☐ NO	**Construction completion date:** 06/29/1994
Has site been put into reuse? ☐ YES ☒ NO Portions: _____	

REVIEW STATUS	
Lead agency: ☐ EPA ☒ State ☐ Tribe ☐ Other Federal Agency	
Author name: Darryl Owens	
Author title: Remedial Project Manager	**Author affiliation:** USEPA, Region 5
Review period:** 01 / 30 / 07 to 06 / 21 / 07	
Date(s) of site inspection: 05 / 17 / 07	
Type of review: Post-SARA Statutory	
Review number: Three	
Triggering action: ☐ Actual RA Onsite Construction at OU # ☐ Actual RA Start at OU#____ ☐ Construction Completion ☒ Previous Five-Year Review Report ☐ Other (specify) : _____	
Triggering action date *(from WasteLAN)*: 06 / 21/ 02	
Due date *(five years after triggering action date)*: 06 / 21 / 07	

* ["OU" refers to operable unit.]
** [Review period corresponds to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, continued

Issues:

1.) The adequacy of institutional controls contained in the Declaration of Restrictive Covenants and Affidavit Concerning Real Property Contaminated with Hazardous Substances which have been recorded for Parcel A (GUE Deep), Parcel B (GUE Shallow), Parcel C (U.S. Transformer), Parcel D (Burn Pit), and Parcel E (Porter Electric) should be assessed.

2.) The adequacy of institutional controls must be ensured with a plan for long term stewardship of the Site.

3.) The protectiveness of the current groundwater cleanup goal for trichloroethylene (TCE) needs to be assessed.

4.) There may be multiple areas in the vicinity of the Burn Pit subsite where the University burned or disposed of chemicals. It is not clear whether further remediation may be needed in this area.

5.) Several maintenance issues were identified during the site inspection. These issues are as follows: 1.) the boundaries for the subsites are not marked; 2.) abandonment of monitoring wells may not be in accordance with Minnesota Department of Health regulations; 3.) the fence around GUE Deep needs repair; and 4.) the warning signs for GUE Deep are faded and do not indicate hazardous wastes are present.

Recommendations:

1.) An Institutional Control Evaluation should be completed by the University of Minnesota to assess the adequacy of the existing institutional controls on a long-term basis. Additionally, the University should develop a long-term schedule for site inspections to ensure institutional controls are in place and complied with.

2.) An Institutional Control (IC) Plan should be developed by U.S. EPA incorporating the results of the University's evaluation of the adequacy of the existing institutional controls and, if necessary, implement additional or corrective measures to ensure long-term stewardship of the Site.

3.) A review of the protectiveness of the current groundwater cleanup goal for TCE should be performed after U.S. EPA Headquarters completes its national risk assessment.

4.) A file search should be performed of the multiple locations where the University may have burned or disposed of chemicals. This review should evaluate the sampling performed and determine whether any follow-up actions may be required.

5.) The maintenance issues identified in the site inspection should be implemented. These issues are as follows: 1.) the boundaries of the GUE Shallow, PE and UST subsites should be marked; 2.) all abandoned monitoring wells should be evaluated to assure the wells were abandoned in accordance with the Minnesota Department of Health well code; 3.) the damaged areas of the GUE Deep fence should be repaired; and 4.) new signs with hazardous waste warning language should be installed.

Protectiveness Statement:

Operable Unit 1

The Operable Unit 1 remedy is functioning as intended and is protective of human health and the environment because cleanup levels are below the current risk level and there is no current or potential exposure. The ground water contamination in monitoring wells was found to be below federal MCLs, State standards for individual compounds, and State cumulative standards for multiple VOCs. Therefore, the pump and treatment system that was constructed in 1987 was shut down on October 30, 1991. The rural water supply system continues to provide safe drinking water to area residents. The remedial action objective to minimize the migration of contaminants to groundwater and surface water has been achieved. The current site groundwater cleanup goal for TCE will be evaluated when U. S. EPA Headquarters completes its National risk assessment for TCE.

Operable Unit 2

The Operable Unit 2 remedy is functioning as intended and is protective of human health and the environment in the short-term. The cleanup of lead contaminated soils was completed in 1993. Lead contaminated soil was excavated and disposed of in an off-site landfill. Commingled lead and PCB contaminated soil was disposed of in appropriate landfills. The lead contamination soil cleanup complies with current guidance for lead cleanup levels in soils. The cleanup of lead contaminated soils has achieved the remedial action objectives of preventing direct contact with, or ingestion of, lead in soil for Operable Units 2. The implementation of institutional controls has prevented exposure to, or ingestion of, contaminated soil to date. However, in order for the remedy to be protective in the long-term, an Institutional Control Evaluation will be prepared to evaluate the adequacy of the institutional controls in the long term, which will include an evaluation of any encumbrances on the title and also an evaluation of whether procedures, such as regular inspections, are in place to ensure long term stewardship. Additionally, an Institutional Control Plan should be developed that incorporates the Institutional Control Evaluation, and, if necessary, implement corrective measures.

Operable Unit 3

The Operable Unit 3 remedy is functioning as intended and is protective of human health and the

environment in the short-term. The cleanup of PCB contaminated soils was completed in 1994. Soils with high concentrations of PCBs were incinerated. Soils with lesser PCB contaminations were consolidated and capped in a fenced area. The PCB contamination soil cleanup complies with current guidance for PCB cleanup levels in soils. The cleanup of PCB contaminated soils has achieved the remedial action objectives of preventing direct contact with, or ingestion of, PCBs in soil for Operable Units 3. The implementation of institutional controls has prevented exposure to, or ingestion of, contaminated soil to date. However, in order for the remedy to be protective in the short term, an Institutional Control Evaluation will be prepared to evaluate the adequacy of the institutional controls in the long term, which will include an evaluation of any encumbrances on the title, a correction of the Declaration of the Restrictions and Covenants for the PE subsite and also an evaluation whether procedures, such as regular inspections, are in place to ensure long term stewardship. Additionally, an Institutional Control Plan should be developed that incorporates the Institutional Control Evaluation, and, if necessary, implement corrective measures.

Overall Site Protectiveness

Overall, the site remedy is functioning as intended and is protective of human health and the environment in the short-term, however, in order for the remedy to be protective in the long-term, the following actions will need to be taken. A review of the protectiveness of the current groundwater cleanup goal for TCE will be performed after U.S. EPA Headquarters completes its national risk assessment. Effective ICs must be implemented and maintained. An Institutional Control Evaluation will be conducted by the University of Minnesota to evaluate the adequacy of the ICs to ensure they are functioning as intended and to ensure effective procedures are in-place for long-term stewardship at the Site. An Institutional Control Plan will be developed by U.S. EPA to incorporate the results of the University's IC evaluation activities and, if necessary, plan for additional IC activities such as implementing additional or corrective measures, along with developing a plan to ensure long-term stewardship of the Site that includes regular site inspections and maintaining, monitoring and certifying the ICs at the Site. A review of sampling which was performed for multiple areas in the vicinity of the Burn Pit subsite shall be performed to ensure that no additional actions are necessary in these areas. Finally, maintenance issues identified in the site inspection should be implemented.

Other Comments:

None

U. S. Environmental Protection Agency
Region 5
Third Five-Year Review
University of Minnesota Rosemount Research Center Site
Rosemount, Minnesota
June 2007

I. Introduction

The United States Environmental Protection Agency (U.S. EPA) Region 5 has conducted a five-year review of the remedial actions implemented at the University of Minnesota Rosemount Research Center Site in Rosemount, Minnesota. The review was conducted between January 2007 and June 2007. This report documents the results of the review. The purpose of five-year reviews is to determine whether the remedy at a site is protective of human health and the environment. The methods, finding, and conclusions of the review are documented in the five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and make recommendations to address them.

This review is required by statute. U. S. EPA must implement five-year reviews consistent with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). CERCLA 121(c), 42 U.S. C. § 9621 (c) states:

If the President selects a remedial action that results in any hazardous substances, pollutants or contaminants remaining at the site, the President shall review such remedial action no less often than every five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented.

The relevant section of the NCP 40 CFR § 300.430(f)(4)(ii),states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

This is the third five-year review for the University of Minnesota Rosemount Research Center Site. The triggering action for this statutory review is the second five-year review report which was signed on June 21, 2002. Since there are hazardous substances, pollutants or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, this five-year review is required.

II. Site Chronology

Table 1 lists a chronology of events for the University of Minnesota Rosemount Research Center Superfund (UMRRC) Site.

Event	Date
Initial discovery of Problem	1984
Response Action Agreement	May 30, 1985
Listed on National Priority List	June 10, 1986
Remedial Investigation/Feasibility (Final Detailed Analysis Report and Conceptual Design Report)	1987
ROD Signature	June 29, 1990
First Explanation of Significant Differences	August 1991
Second Explanation of Significant Differences	October 1, 1993
Preliminary Site Close Out Report	June 29, 1994
Final Site Close Out Report	June 19, 1996
First Five-Year Review	June 6, 1997
Deletion from the National Priority List	February 6, 2001
Second Five-Year Review	June 21, 2002

III. Background

A. Physical Characteristics

The UMRRC Site is located within the city limits of Rosemount in Dakota County, Minnesota approximately 15 miles southeast of the Minneapolis/St. Paul metropolitan area (Figure 1). The UMRRC Site covers approximately five square miles and is used primarily as an agricultural research station although some light manufacturing and service companies are present. Within

the confines of the UMRRC site several disposal sites were investigated. These sites are the George's Used Equipment (GUE) Site, the Porter Electric and Machine Company (PE) Site, the U.S. Transformer Site (UST) and the Burn Pit Site.

Land and Resource Use

Land adjacent to the UMRRC Site is used for agriculture and rural residences. Approximately 7,000 people live within a 4-mile radius of the site and less than 75 people live within a 1-mile radius of the site. Approximately 50 residential and business ground water wells are present north and east of the site. No significant surface water resources are present on the site. The Mississippi River is located approximately 5 miles east and northeast of the site and acts as a regional discharge point for groundwater.

The topography of the site is the result of glacial deposition and is generally level except the southeast corner, which is bounded by a northwest/southwest trending ridge. The site is underlain by 75 to 150 feet of outwash sand and gravel which constitute the upper aquifer. The sand and gravel is underlain by fractured dolomite, although in places, these two units are separated by clays. The dolomite is hydraulically connected to the underlying Cambrian Jordan Sandstone and forms the second aquifer of concern. The Jordan Sandstone is underlain by the St. Lawrence Formation, a dolomitic siltstone that acts as a regional aquitard. A third water bearing unit, the Franconia formation, underlies the St. Lawrence Formation but is not widely used as a water source in the area and is not presently at risk.

A major erosional bedrock valley is present in the northern portion of the site and is filled with sand and gravel deposits. This valley fill modifies the regional groundwater flow direction, which is generally to the east-northeast. The valley divides into two branches, one to the north and one to the east, both of which ultimately discharge to the Mississippi River. The water table is present at a depth of 60 to 70 feet, within the outwash sand and gravel.

History of Contamination

The UMRCC site was originally developed as a federal ammunition manufacturing plant during the early 1940s. Operation ceased in 1945 and the facility was deeded over to the University of Minnesota (University). Since that time, the UMRCC has been used by the University for research. The University also leased various sites and facilities to individuals and small businesses. Specific to this Superfund Site, the University contracted with tenants who disposed of lead, copper, and polychlorinated biphenyls (PCBs) in three industrial disposal sites: the George's Used Equipment (GUE) site, the Porter Electric and Machine Company (PE) site, and the U.S. Transformer (UST) site.

The GUE Site was used as an electrical equipment storage facility, as well as, a general salvage facility between 1968 and 1985. The activities conducted at the GUE site included reclamation of copper wire by burning off insulation, the salvage of electrical equipment, batteries, and

drums; incineration of liquids including polychlorinated biphenyl (PCB) contaminated oils; and unidentified drum handling/storage and transfer activities. Most of the PCB oils were apparently disposed of in a depression area, although low-level contamination is widespread at the GUE site. Some solvents were also released at the GUE site. The contamination of soil with lead is believed to have been associated with lead acid battery and wire reclamation activities at the GUE site.

The Porter Electric and Machine (PE) Company leased property immediately south of the GUE site and operated from 1968 to 1971. The property was used for storage and reconditioning of used industrial electrical equipment. PCB contaminated oils generated from these activities reportedly were spread on roads in the area. An area of soil contaminated by PCBs exists at the PE site.

U. S. Transformer leased property approximately 2000 feet northeast of the GUE site and operated there from 1973 to 1978. The property was used for dismantling and salvaging electrical transformers. Waste oils from these activities were reportedly washed off a concrete slab onto the soil at the UST site. An extensive area of PCB contaminated soil exists at the UST site.

The Burn Pit site, located just north of 160th Street, mid-way between Akron and Blaine Avenues, was used by the University as a disposal area for waste chemicals. Unconfirmed reports suggest disposal of chemicals began in this area in the early 1960s. University records indicate that between 1968 and 1974, approximately 90,000 gallons of laboratory chemicals, solvents, corrosives, salts, heavy metals, organics and inorganics were infiltrated and or burned in the pit. The pit was lined with lime, backfilled with sand and capped with clay in 1980.

Initial Response

The investigation of the UMRCC site began in January 1984, when, during routine monitoring of the neighboring Pine Bend Landfill, the Minnesota Department of Public Health (MDH) detected 1.3 parts per billion (ppb) chloroform in a residential well upgradient of the Pine Bend Landfill. In July 1984, additional sampling occurred, as well as, a site inspection by MPCA, County and University officials. As a result of these investigations, the MDH issued well advisories to 27 families whose wells were contaminated with chloroform above the State of Minnesota Recommended Allowable Limit (RAL).

On October 4, 1984, the MPCA issued a Request for Response Action (RFRA) to the University. After formal negotiations, the University and the MPCA signed a Response Action Agreement (Agreement) on May 30, 1985, under the Minnesota Environmental Response and Liability Act (MERLA) for the cleanup of the Site. In June 1986, the Site, the area to which the Agreement applies, was placed on U.S. EPA's National Priority List.

The Site was divided into three operable units for investigation and cleanup purposes. All

operable units are contained within a small geographic area inside the UMRRC Site. The UMRRC Site ("Site") is composed of the Burn Pit and GUE, PE and UST subsites. The Site Record of Decision (ROD), dated June 29, 1990, documented the selection of Remedial Actions (RAs) for the soil operable unit (GUE, PE and UST Sites) and the ground-water operable unit (Burn Pit Site). Subsequent to the execution of the Site ROD, the soil operable unit was divided into two operable units: Operable Unit 2 (OU2) - soil contaminated by lead, copper and polychlorinated biphenyls (PCBs) from the GUE site, and Operable Unit 3 (OU3) - soil contaminated by PCBs from the GUE, PE, and UST sites. Therefore, OU3 consists of only PCB-contaminated soil and concrete from the three industrial disposal areas. Operable Unit 1 (OU1) consisted of the Burn Pit site and the contaminated ground water from the Burn Pit site.

The soil remedy was divided into two operable units because the Remedial Action (RA) cleanups for these operable units were different. The RA for OU2 soil was the off-site disposal of lead, copper, and PCB contaminated soil (PCB soil that could not be economically separated from the lead and copper contaminated soil) in landfills designed to receive this waste. The RA for OU3 was the on-site thermal desorption with fume incineration of PCBs. The remedy implemented for OU1 was a ground water pump and treatment system. Remedial Investigation/Feasibility Study (RI/FS) activities for all operable units began as early as 1984 and continued through 1988.

Operable Unit 1

At the Burn Pit Site, volatile organic chemicals (VOCs) that were not completely burned infiltrated into the ground water and contaminated the drinking water of some nearby Rosemount residents. In 1984, 16 residential wells to the northeast of the Burn Pit site were found to be contaminated with chloroform. The primary contaminant of concern for OU1 was chloroform. Other chemicals from the Burn Pit site were found in the ground water, but were at lower levels that did not qualify as chemicals of concern.

The maximum concentration of chloroform found was 72 parts per billion (ppb). This concentration was found in a monitoring well one mile east of the Burn Pit site. The chloroform ground water plume was found to extend approximately four miles to the east and northeast of the Burn Pit site.

Operable Units 2 and 3

In late 1985, the GUE/PE/UST soil remedial investigation (RI) became a separate investigation from the groundwater solvent contamination. The RI determined that soil and concrete on these three industrial disposal sites were contaminated by PCBs. At the GUE site, the surface soil PCB concentrations ranged from 1.7 to 42,000 parts per million (ppm). The soil PCBs were generally found in the upper nine feet of soil. However, high concentrations of PCBs were also found in a natural depression to a depth of 36 feet and trace amounts of PCBs in the depression extended to a depth of 61 feet below the surface. The PCBs were identified as Aroclors 1260 and 1254. Soil lead concentrations ranged up to 40,000 ppm and soil copper concentrations up to 310,000 ppm.

These metal contaminants were generally confined to surface soil. Lead and copper were not found in amounts to make these contaminants of concern at the UST and PE sites.

At the PE site, the soil PCB concentrations range from 3.8 to 63,000 ppm. The PCBs were identified as Aroclors 1242, 1248, 1254, and 1260. PCBs were found to a depth of 74.5 feet below the surface, but generally were at concentrations less than 10 ppm below 43 feet.

At the UST site, the soil PCB concentrations were widespread but at low concentrations. The PCBs were identified as Aroclor 1260.

At the end of the RI, the University estimated that the volume of materials contaminated in excess of 1 ppm PCB and 50 ppm lead was 2,500 cubic yards of lead contaminated soil; 160 cubic yards of PCB contaminated concrete; and 57,000 cubic yards of PCB contaminated soil. Lead and PCBs were not found in the ground water under these three industrial sites. In summary, the Site contaminants of concern were identified as chloroform (OU1), lead, copper, and PCBs (OU 2 and OU 3).

Basis For Taking Action

Soil sampling indicated that soils at the GUE, UST and PE sites were contaminated with lead copper and PCBs at maximum concentrations of 63,000 ppm, 310,000 ppm and 40,000 ppm, respectively. The human health risk assessment found that there would be an unacceptable carcinogenic (cancer causing) risk from exposure to PCBs and an unacceptable non-cancer risk from exposure to lead in the soils.

Groundwater was found to be contaminated with chloroform at a maximum concentration of 72 parts per billion (ppb). This concentration was found in a monitoring well one mile east of the Burn Pit site. In 1984, the MDH issued well advisories to 27 families whose wells were contaminated with chloroform above the State of Minnesota Recommended Allowable Limit (RAL) for chloroform. In 1984 the RAL for chloroform was 1.9 ppb, which was raised to 5 ppb and then to 57 ppb in early 1988. Although the RAL of 57 ppb was not exceeded in the residential wells, the University agreed to take action.

IV. Remedial Actions

Remedy Selection

After reviewing the results of the Remedial Investigation/Feasibility Study (RI/FS), the Minnesota Pollution Control Agency (MPCA) completed a ROD on June 11, 1990. U. S. EPA concurred on the ROD on June 29, 1990. The selected remedies for the site operable units are described below:

Operable Unit 1

The remedial action objectives for Operable Unit 1 were to provide safe drinking water to affected residences and to achieve groundwater cleanup goals in the contaminant plume. The remedy for Operable Unit 1 included a ground water pump and treat system and also a water supply system for the residential wells. The pump and treat system consisted of a pumping well downgradient of the Burn Pit Site to capture the contaminant plume. The pumping well discharged contaminated groundwater to a packed tower aeration treatment system with final treatment in an infiltration pond. The water supply system consisted of two water supply wells completed in the Jordan Sandstone Formation and two pump houses and distribution lines to the 27 residences with contaminated drinking water. The groundwater pump out system was to continue operation until the groundwater met the RAL for chloroform of 57 ppb.

It should be noted that the ground water pump and treatment system was in place and operating at the time the ROD was written. In addition, the water supply system was under construction at the time the ROD was written. These cleanup actions had been undertaken by the University as a part of its response under the 1985 MERLA Response Action Agreement.

Operable Units 2 and 3

The remedial action objective at Operable Units 2 and 3 was to eliminate human health risks through direct contact with lead and PCB contaminated soils. The selected remedy for the Operable Units 2 and 3 soil and concrete cleanup had five major components:

1.) Excavating approximately 6,500 cubic yards of soil and concrete contaminated with greater than 25 ppm PCBs and approximately 2,600 cubic yards of soil contaminated with copper and lead where the soil exceeded 1,000 ppm lead;

2.) Consolidating approximately 15,000 cubic yards of soil from the three disposal sites contaminated with between 10 and 25 ppm PCBs at the GUE site and restricting access;

3.) Thermally destroying the PCBs in the soil and concrete by on-site thermal desorption and fume incineration;

4.) Transporting the soil contaminated with lead and copper to an off-site RCRA-permitted landfill (and transporting the lead and copper contaminated soil which also had PCBs exceeding 49 ppm to a Toxic Substance Control Act (TSCA)/ Resource Conservatory and Recovery Act (RCRA) permitted landfill); and

5.) Backfilling with clean soil, grading and establishing vegetation.

Based on a request from the University, the ROD was modified in August 1991 by an Explanation of Significant Difference (ESD) by MPCA and concurred with by U.S. EPA.

The changes approved in the ESD were:

1.) Allowing the University the option of using either on-site incineration (incineration of soil not just fumes) or the previously approved alternative of on-site thermal desorption and fume incineration;

2.) Allowing the University to restrict access to the three disposal sites (GUE, PE and UST) with PCB levels of between 10 and 25 ppm PCBs rather than consolidating soils from all three sites at the GUE site; and

3.) Allowing the University to perform a review of the effectiveness of the remedial action three years after completion of the remedy rather than three years after the approval of the remedial action clean-up plan.

The University chose to destroy the PCBs by the on-site incineration option.

Based on a second request from the University in June 1993 to change the site remedy, a second ESD was issued in October 1993 which approved the following changes:

1.) The University requested that it be allowed to consolidate soil contaminated with between 10 and 25 ppm PCBs in George's Used Equipment (GUE) Deep as originally described in the ROD. The University decided that it was now more feasible to consolidate the soil than was envisioned at the time of the first ESD. The consolidation of soils at the GUE Deep would allow the GUE, PE and UST sites to be used for "unrestricted" use in the future.

2.) All remaining soil contaminated with 1 to 10 ppm PCBs will be covered with 10 inches of clean fill in order to comply with the TSCA PCB Spill Policy and to provide "unrestricted access" to these areas.

The ROD had required that lead-contaminated soil that was also contaminated by PCBs in excess of 49 ppm be disposed in a TSCA-/RCRA-permitted landfill. This concentration should have been identified as 50 ppm PCBs pursuant to the land disposal restrictions of RCRA. The latter concentration was used to determine what type of landfill was used for the off-site disposal of lead and PCB contaminated soil.

The ROD identified copper as a soil contaminant associated with lead contamination of soil. Lead was viewed as an indicator chemical for copper contamination. Therefore, the disposal of lead contaminated soil in off-site landfills also resulted in the disposal of copper contaminated soil.

In addition to the remedy changes addressed in the ESDs, the ROD also required that the University review remedies, not previously reviewed, that could further remediate the lead and PCBs left on site and evaluate them for cost, environmental effects, and effectiveness. In

November 1996, the University submitted three reports regarding lead clean-up technology carried out at the Coleraine Minerals Research Laboratory. In February 1997, the University submitted a "feasibility study" report evaluating lead and PCB remedies.

The feasibility study report evaluated three new technologies that could possibly remediate approximately 750 cubic yards of residual PCB and lead contaminated soil that remain in the restricted area of the Site. The technologies included a biological process for treating PCBs, a dechlorination/detoxification treatment for PCBs and a particle separation process for lead impacted soil.

The PCB-Rem process (biological treatment) employs hydrogen peroxide and ferrous sulfate to partially dechlorinate PCB molecules in the soil matrix. Biodegradation then allows microorganisms to further degrade the compounds. The process requires excavation of the soil and treatment in a reaction vessel. Previous bench scale study data suggested that the process could degrade PCB in soil to less than 2 ppm.

The Solid Phase Extraction process (dechlorination/detoxification treatment) uses solvents to strip PCBs, from the excavated soil in a contact tank. Small polystyrene beads are mixed into the slurry. The PCBs suspended in the solvent repartition onto the styrene beads. The beads are floated to the surface of the mixture using water and are collected and disposed. Soil vapor extraction is then used to remove residual solvent from the soil matrix. The process was determined to have promise, but the effectiveness for soil at this Site would require treatability studies.

The third alternative was a lead reduction process that uses physical separation techniques to separate soil by size. Analysis of the various size fractions is used to determine what size fraction the lead is concentrated. The size fraction containing higher concentrations of lead are separated and disposed. The process is reported to be effective at removing lead from soil, but has not progressed past the bench scale phase of development. In addition the soil types at the Site are significantly different than those in the study site and the distribution by particle size versus lead concentrations is not known. Screening water would also have to be treated in this method.

The recommendations from the feasibility report were that all of the methods evaluated were less cost effective than the on-site incineration or off-site disposal alternatives that were previously implemented at the Site. In addition, treatability studies would be required to determine the actual effectiveness of the remedies on site soil. The high cost associated with additional studies and the remedies themselves lead to the recommendation that these alternatives not be pursued. The MPCA staff concurred with the recommendation.

Further requirements for the Remedial Action were identified after the ROD was written. These requirements were as follows:

1.) In order to operate a thermal destruction unit in Minnesota, the MPCA staff issued an "Authorization to Install and Operate a Thermal Destruction Unit (TDU), University of Minnesota Rosemount Research Station," (Authorization to Burn) on December 27, 1991. The Authorization to Burn was modified on February 3, 1992, and August 17, 1992.

These modifications reduced the scope of the Authorization to Burn based on additional information received from the University.

The Weston TDU was permitted to operate under a TSCA permit. The TSCA permit required that the TDU leave no more than 2 ppm PCBs in the ash from the incineration process. This concentration meets the ROD clean-up requirements.

The ROD did not identify on-site disposal requirements for wastewater generated from the TDU; however, the MPCA Division of Water Quality staff identified these requirements in a memorandum dated December 10, 1992. The wastewater was required to contain less than 15 ppb lead; 0.5 ppm PCBs; 250 ppm chlorides; and no detectable dioxins or furans at a detection limit of 1.0 nanograms/gram/congener.

2.) The ROD did not identify any requirement for a cover over areas to be designated unrestricted use (cleaned up to 10 ppm PCBs). U. S. EPA clarified that these areas would need a cover of at least 10 inches of "clean soil" of less than 1 ppm PCBs. This is a requirement specified in the TSCA PCB Spill Policy. TSCA does not require a cover over fenced areas left with between 10 and 25 ppm PCBs; however, the ROD required a 16-inch cover of clean soil over GUE Deep.

As stated in the ROD, the Office of Health and Environmental Assessment (OHEA) has concluded that a PCB level of 25 ppm in soil would present less than a 1E-07 level of carcinogenic inhalation risk to people on site who work more than 0.1 kilometers from the actual spill area (estimating a spill area of less than 0.5 acres). Therefore, the cover reduces this inhalation carcinogenic risk to below 1E-07. Also as stated in the ROD, a 10-inch cover would reduce the overall PCB risk for 10 ppm PCB soils to 1.54 E-05. A sixteen inch cover should reduce the risk from 10 to 25 ppm PCB contaminated soil to below 1E-05 for all soils covered at the Site.

Remedy Implementation

Operable Unit 1

On December 4, 1986, the MPCA staff completed a Minnesota Decision Document that approved the original OU1 RA. The major components of the RA were: the installation of new individual residential wells drilled into the Franconia Aquifer and a ground water pump and treatment system with packed tower aeration and discharge to an infiltration pond. The pump and treatment system was constructed in 1987; however, the residents rejected the individual wells in the Franconia Aquifer because of the potential problems with iron bacteria.

In 1988, based on new toxicological information, the State of Minnesota health-based guideline for chloroform was raised from 1.9 ppb to 57 ppb. Since the concentration of chloroform in all residential wells was below 57 ppb, the drinking water well advisories issued by the Minnesota Department of Health to the Rosemount residents became unnecessary. However, the University decided to proceed anyway with its plan to provide the residents with an alternate, long-term water remedy - a community rural water supply. The water supply system consisted of two wells housed in separate pump houses drilled in the Jordan Sandstone Formation with distribution lines to the 27 residences whose wells had drinking water well advisories previously issued by the Minnesota Department of Health (MDH). The construction of the water supply began in 1989 and was completed in 1991. The Site ROD memorialized the selection of the final OU1 RA to be the ground-water pump and treatment system combined with the community rural water supply.

The MPCA staff approved the shutdown of the pump and treatment system on October 30, 1991. This was in part due to the MDH changing its Recommended Allowable Limit (RAL) for chloroform from 5 to 57 ppb. The groundwater was also found to meet other state ground water drinking water criteria. The MPCA staff required continued groundwater monitoring of the Site. The ground water results indicate that the ground water has remained potable.

Operable Unit 2

During July and August 1990, the University disposed of soil contaminated with lead and copper from the GUE site. The soil contaminated with lead and copper and less than 50 ppm PCBs was disposed of at the Adams Center Landfill in Ft. Wayne, Indiana, a Resource Conservation and Recovery Act (RCRA)-permitted landfill. Soil contaminated with lead and copper and greater than 50 ppm PCBs was disposed of at the Chemical Waste Management, Inc., Landfill in Emelle, Alabama, a Toxic Substances Control Act (TSCA)/RCRA-permitted landfill. Approximately 4,384 tons of soil were removed and placed in these landfills.

In 1993, during the implementation of the remedy for OU3, the University identified and transported an additional 100 cubic yards of soil contaminated with lead in excess of 1,000 ppm (but less than 50 ppm PCBs) to the Adams Center Landfill.

During the consolidation of soil contaminated with between 10 and 25 ppm PCBs at the end of the OU3 RA, the University also placed lead-contaminated soil in GUE Deep. The release sampling results showed that the highest lead concentration found outside of GUE Deep was 669 ppm lead, with most release samples showing less than 100 ppm.

Operable Unit 3

Implementation of the OU3 RA began in the summer of 1992 with the excavation of contaminated soil. The University chose Roy F. Weston, Inc. (Weston) as the RA contractor.

Weston began assembly of the mobile thermal destruction unit (TDU) in December 1992; began burning clean soil in February 1993; and began incinerating contaminated soil in March 1993; and completed the incineration in July 1993. On September 24, 1993, the MPCA and U. S. EPA staff conducted a preliminary site close-out report inspection. At this time the only remaining work at the Site involved installing a fence at the GUE site and spreading topsoil, mulching and seeding the Site areas that were excavated and restored. A final close-out report inspection was conducted on September 30, 1994, and all construction activities were found to be completed.

A total of approximately 7,000 cubic yards of soil were excavated and 12,100 tons were thermally treated. Large pieces of contaminated concrete were also excavated but due to low levels of contamination these pieces were consolidated at the GUE Deep (the name given to the pit where the ash and soil contaminated between 10 and 25 ppm PCBs were placed at the GUE site) rather than incinerated because of likely damage to the rotating kiln.

In 1993 and 1994, after demobilization of the TDU, an additional 350 cubic yards of soil and concrete between 10 and 25 ppm PCBs were consolidated at the GUE Deep pursuant to the second Explanation of Significant Difference. Also consolidated in the GUE Deep were approximately 65 cubic yards of soil scrapings removed from operational areas that were contaminated with greater than 1 ppm (and less than 25 ppm) PCBs. Another 36 cubic yards of PCB contaminated soil in excess of 25 ppm PCBs discovered during release sampling was sent to the U.S. Pollution Control Inc., Grassy Mountain Facility in Clive, Utah.

By the summer of 1994, areas excavated were backfilled, compacted, and graded. A 16-inch cover of material of less than 2 ppm PCBs was placed over the GUE Deep. The top six inches of this cover was topsoil with less than 1 ppm PCBs. The cover was vegetated and a fence designed to restrict access to the GUE Deep was placed around its perimeter.

A 10-inch cover of less than 1 ppm PCBs was placed over all areas left with between 1 and 10 ppm PCBs. The top six inches of this cover was clean topsoil of less than 1 ppm PCBs, which was also vegetated. At the conclusion of the TDU soil incineration, 25,000 gallons of TDU wastewater remained for on-site disposal. The wastewater met the disposal criteria of 15 ppb lead; 0.5 ppm PCBs; and no detectable dioxins or furans at a detection of 1.0 nanograms/gram/congener. The MPCA staff granted a waiver to its disposal criterion of 250 ppm chlorides for the slightly elevated levels of 229 to 472 ppm chlorides. This water was disposed of on site at the GUE. Since all response actions were completed and releases from the site did not pose any further threat to human health or the environment, the U.S. EPA deleted the University of Minnesota Rosemount Research Center site from the National Priorities List on February 6, 2001. However, since contaminants remain at the site above levels that allow unlimited use and unrestricted exposure, U.S. EPA is still required to conduct five-year reviews to ensure that the site remedy remains protective of human health and the environment.

Institutional Controls

Institutional controls (ICs) are non-engineered instruments, such as administrative and legal controls that help to minimize the potential for exposure to contamination and that protect the integrity of the remedy. ICs are required to assure the long-term protectiveness for any areas which do not allow for unlimited use or unrestricted exposure. ICs are also required to maintain the integrity of the remedy. The 1990 ROD did not include institutional controls as part of the remedy. However; the ROD did include fencing, which is an access control, to limit access to the GUE Deep area where soils containing 10 to 25 ppm PCBs were consolidated. Additionally, while again not including institutional controls, the 1993 ESD indicated that the consolidation of the PCB soils in the GUE Deep area would allow cleanup to "unrestricted" (meaning residential, commercial and rural) usage for a majority of the University of Minnesota Rosemount Research Center site.

On May 11, 2000, the University, apparently as a condition for delisting the site from the state priorities list, recorded the following documents with the Office of the County Recorder, Dakota County, Minnesota: "Declaration of Restrictions and Covenants" and "Affidavit Concerning Real Property Contaminated With Hazardous Substances." These documents were signed by the Interim Treasurer for the University and the Commissioner for the MPCA. Both the Declaration and the Affidavit contain as exhibits "Sketch[es] of Description" prepared by a Registered Land Surveyor that map out the metes and bounds of the areas with use restrictions, including the PE, UST, GUE and Burn Pit subsites. There is no current evaluation of the title for the real property comprising the Site. (Therefore, it is unclear whether the recorded environmental restrictive covenants and affidavit are in the chain of title or whether some interest, such as a mortgage or utility easement, might defeat the efficacy of the institutional controls.)

The Declarations contain the following restrictions for areas with soil contamination up to 10 ppm PCBs: maintenance of a 10 inch soil cap in outdoor exposure areas, limitation to commercial and industrial use, and prohibition of the following uses: day care centers, any form of primary or secondary educational facility, churches, social centers, hospitals, elder care facilities, nursing homes, recreational, and single or multiple family dwellings.

The Declaration for Parcel E, also known as the Porter Electric subsite, indicates that PCBs remain in the soil at a concentration of 3.5 ppm. This conflicts with Section 7 of the Affidavit which states that release sample test results were less than 1 ppm. The Affidavit also states that no cap was needed for the Porter Electric (PE) subsite because it met the PCB or background clean up criteria. Since both the site soil cleanup goals and the Affidavit indicate that a more stringent cleanup occurred at the PE site, the MPCA has done further investigation into the conflicting cleanup levels Stated in the Declaration and the Affidavit for the PE subsite. Based on its investigation, the MPCA has concluded that the Release Sampling Exhibits M and N from the Affidavit support the 1 ppm PCB cleanup level for the PE subsite and thus, the 3.5 ppm PCB concentration stated in the Declaration is in error. Therefore, the University should correct the Declaration to say 1 ppm PCBs remaining, submit the corrected Declaration for MPCA

concurrence and record the corrected Declaration.

Another issue regarding the Declarations of Restrictions and Covenants is monitoring of their effectiveness. While there is no evidence that the site is currently not protective, there is no mechanism in place for regular inspection of the Site other than the five-year review to ensure land uses are not occurring in violation of the declarations. A mechanism may need to be instituted to ensure more regular inspection of the Site. The inspection should also evaluate the physical state of the remedy and identify any needed maintenance issues. For instance, the restrictive covenants could be modified to require regular monitoring and reporting by the Site owner or perhaps an agreement for regular site inspection by University personnel could be made with MPCA.

Table 2. Institutional Controls Summary Table		
Media, Engineered Controls & Areas that Do Not Support UU/UE @ Current Conditions	**IC Objective**	**IC Instrument Implemented**
Parcel A (GUE Deep)	1.) Prohibits disturbance or alteration of any nature on, above or beneath Parcel A without approval of MPCA. Requires that a 10 inch soil cap be maintained. Requires, at minimum, a six foot chain link fence to restrict access to authorized personnel.	Declaration of Restrictions and Covenants (1/3/2000)
	2.) Discloses that property is contaminated with hazardous wastes. Provides identity, location quantity etc. of hazardous substances.	Affidavit Concerning Real Property Contaminated With Hazardous Substances (11/5/99)
Parcel B (GUE Shallow) and Parcel C (UST Site)	1.) Limits land use to commercial /In-dustrial. Prohibits use for day care center, any type of educational facilities, churches, social centers, hospitals, elder care facilities nursing homes, recreational, and single or multiple family dwellings. Requires that a 10 inch soil cap be maintained. Prohibits soils excavated from Parcels B and C from being used as clean fill off-site. Any removal of soils for other purposes must be approved by MPCA.	Declaration of Restrictions and Covenants (1/3/2000)
	2.) Discloses that property is contaminated with hazardous wastes. Provides identity, location quantity etc. of hazardous substances.	Affidavit Concerning Real Property Contaminated With Hazardous Substances (11/5/99)

Table 2. Institutional Controls Summary Table		
Media, Engineered Controls & Areas that Do Not Support UU/UE @ Current Conditions	**IC Objective**	**IC Instrument Implemented**
Parcel D (Burn Pit)	1.) Prohibits disturbance or alteration of any nature on, above or beneath Parcel D without approval of MPCA. Requires that a soil cap be maintained in all outdoor exposure areas to minimize direct contact and infiltration. 2.) Discloses that property is contaminated with hazardous wastes. Provides identity, location quantity etc. of hazardous substances.	Declaration of Restrictions and Covenants (1/3/2000) Affidavit Concerning Real Property Contaminated With Hazardous Substances (11/5/99)
Parcel E (PE Site)	1.) Limits land use to commercial /In-dustrial. Prohibits use for day care center, any type of educational facilities, churches, social centers, hospitals, elder care facilities nursing homes, recreational, and single or multiple family dwellings. Prohibits soils excavated from Parcel E from being used as clean fill off-site. Any removal of soils for other purposes must be approved by MPCA. 2.) Discloses that property is contaminated with hazardous wastes. Provides identity, location quantity etc. of hazardous substances.	Declaration of Restrictions and Covenants (1/3/2000) Affidavit Concerning Real Property Contaminated With Hazardous Substances (11/5/99)

U.S. EPA prepared two GIS maps of the Site that illustrate areas of restricted use. See Figures 2 and 3 which are attached.

An Institutional Control Evaluation will be undertaken by the University of Minnesota to fully explore whether the ICs are functioning as intended to ensure long-term protectiveness of the remedy. An Institutional Control Plan will be developed by U.S. EPA to incorporate the results of the IC evaluation activities and provide for corrective measures as needed.

Systems Operation/Operation and Maintenance

Portions of the site are periodically inspected for maintenance issues by virtue of the fact that the University maintenance building is located adjacent to the GUE and PE subsites. Since the UST and Burn Pit subsites are in a more remote location, inspection is less frequent. There is no formal, scheduled inspection requirement in place for the site. The University has incurred nominal costs for maintenance of the site.

In order to ensure continued protectiveness, a formal inspection schedule should be established. Also, long-term stewardship must be assured which includes maintaining and monitoring effective ICs. The plan to incorporate these activities will be included in the Institutional Control Plan mentioned above.

V. Progress Since the Last Five-Year Review

This is the third five-year review for the University of Minnesota Rosemount Research Center Site. The second five-year review was completed and signed in June 2002. Recommendations from the 2002 five-year review are as shown in Table 3 below:

Table 3: Actions Taken Since the Last Five-Year Review

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Possible residential use of the site	No immediate residential use of site is proposed at this time.	University of Minnesota	None	No action necessary at this time	None
Maintain restricted access to GUE Deep Subsite	Restricted access has been maintained. Also, see recommendations regarding maintenance of fence and signs at GUE Deep in Section IX of this five-year review.	University of Minnesota	December 2007	Follow up actions pending.	None

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Consider sealing and abandoning remaining groundwater monitoring wells	Decision on possible abandonment should be deferred until the adequacy of the current groundwater cleanup goal for TCE is determined. See recommendation in Section IX of this five-year review.	University of Minnesota	June 2008	Follow Up action pending.	None

VI. Five Year Review Process

Administrative Components

The University of Minnesota Rosemount Research Center five-year review was prepared by Darryl Owens, U.S. EPA Remedial Project Manager for the site. David Douglas, Project Manager with the Minnesota Pollution Control Agency also assisted in the review. The five-year review consisted of a review of relevant documents and a site visit.

Community Involvement

An ad was placed in the local newspaper on March 17, 2007 announcing that the five-year review was being conducted. The completed report will be available in the information repository. Notice of its completion will be placed in the local newspaper and local contacts will be notified by letter. A copy of the Public Notice ad is included in Attachment 4.

Document Review

This five-year review consisted of a review of relevant documents including the most recent groundwater monitoring data from 2002. See Attachment 1 for the documents reviewed

Data Review

Operable Unit 1

Groundwater monitoring was performed at the site from March 2000 through March 2002.

Abandonment activities conducted in 1998 through 2000 resulted in the sealing of 40 monitoring wells across the site. Eleven monitoring wells remain active, including five wells retained by the University to monitor this investigation, and two wells that will likely be abandoned in the future. Four additional wells are used for monitoring a separate investigation.

The final round of groundwater sampling included monitoring wells MW-21D, MW-22, MW-23D, MW25, and MW-28. These wells were sampled by Matrix Technologies, Inc. on January 17 and 18, 2002, and the ground water samples were submitted to Pace Analytical Services, Inc. for VOC analysis. The results of the laboratory analysis indicated that chloroform was detected in ground water samples collected from all five monitoring wells at concentrations ranging from 2.3 to 23 micrograms per liter (μg/l), which was less than the MDH drinking water criteria of 60 μg/l. Trichloroethylene was detected in MW-23D at a concentration of 2.6μg/l, less than the federal maximum contaminant level of 5 ug/l.

The Minnesota Department of Health Cumulative Hazard Index (CHI), was calculated for all wells using the 2002 data and compared to historical CHI results. None of the five monitoring wells had a CHI result of greater than 1, the level indicating an excessive cancer risk due to multiple VOCs.

Based on the groundwater sampling results, the MPCA determined that the groundwater was potable and therefore, no further groundwater sampling was necessary.

Operable Unit 2 and 3

There is no new data for the soil cleanups that were performed under these operable units which were completed in 1993 (Operable Unit 2) and 1994 (Operable Unit 3).

Site Inspection

The site inspection was performed on May 17, 2007 by Darryl Owens, U.S. EPA Remedial Project Manager. Also in attendance at the inspection were David Douglas, Project Manager and Steve Thompson of the Minnesota Pollution Control Agency and Gordon Girtz and Steve Lot of the University of Minnesota. The site inspection checklist is included as Attachment 3 to the report.

The inspection consisted of walking the perimeters of the GUE Shallow, PE and UST subsites and also inspection of the Burn Pit cap and GUE Deep fenced area. The GUE Shallow and UST subsites had 10 inches of clean soil placed over the remediated soils. The PE subsite did not require any clean soil placement because the soils had been remediated to 1 ppm PCBs. In preparation for the site inspection, Mr. Girtz had the boundaries of the subsites marked. This was very important since these subsites are now open fields with no permanent delineation of the boundaries. The inspection found these subsites undisturbed and in compliance with the institutional controls in place for the subsites. However, in order to assure future compliance with institutional controls, the site boundaries should be permanently marked. One suggested means would be to put 6 foot high metal fence posts at the four corners of each subsite. While inspecting the GUE Shallow subsite, an abandoned monitoring well was observed. The casing was filled with concrete but there was some standing water in the top of the casing. The concrete base was also left in place and was deteriorated. The University should review the Minnesota

Department of Health well code to make sure this well and all other wells were properly abandoned.

The remedial action for the GUE Deep subsite consists of a fenced area where soils contaminated with 10-25 ppm PCBs were consolidated. The PCB contaminated soils are covered with 16 inches of clean soil. The GUE Deep subsite was found to be undisturbed, however, the fence was damaged in two places near a wooded area adjacent to the fence. While access appeared unlikely in these areas, the fence should still be repaired. The warning signs on the fence which read "Danger Unauthorized Personnel Keep Out" were faded. The signs should be replaced and the new signs should also specifically indicate that hazardous wastes are present.

The Burn Pit subsite is a cap over an area where the University burned laboratory chemicals. The clay cap was mowed and there were no signs of erosion. Some minor deterioration of the surface of the cap had recently been repaired. The boundaries of the subsite were generally marked by fence posts from a fence which had previously enclosed the burn pit. No deficiencies were observed for this subsite. While inspecting the Burn Pit subsite, Dave Douglas of the MPCA indicated that there may have been a smaller pit in this area where chemicals had also been burned or disposed of. Mr. Douglas asked Mr. Girtz of the University of Minnesota whether he knew where this area was. Since Mr. Girtz was not actively involved with the site during the investigation stage, he was not sure where this area would have been. See Section VII., Question C of this review for further discussion on this matter.

In general, the inspection found that the remedial actions at the site remain protective and that there are not any activities that would be in conflict with the site restrictions contained in the institutional controls. However, the following actions discussed above need to be performed: 1.) The boundaries of the GUE Shallow, PE and UST subsites should be marked. 2.) All abandoned monitoring wells should be evaluated to assure the wells were abandoned in accordance with the Minnesota Department of Health well code. 3.) The damaged areas of the GUE Deep fence need to be prepared. 4.) New signs with hazardous waste warning language should be placed on the GUE Deep fence.

Interviews

Gordon Girtz of the University of Minnesota was interviewed as part of the five-year review. Mr. Girtz indicated that the University is in the process of evaluating potential redevelopment alternatives for the Site, including residential and commercial development. U.S. EPA intends, in the current and future five-year reviews, to thoroughly evaluate the groundwater and soil remedy relative to any ongoing or proposed redevelopment activities to ensure that the remedy remains protective. Mr. Girtz also attended the site inspection.

VII. Technical Assessment

The following questions address the issue of protection of human health and the environment by

the remedy at the University of Minnesota Rosemount Research Center Superfund Site.

Question A: Is the remedy functioning as intended by the decision document?

YES

The review of documents, ARARs, risk assumptions, and the results of the site inspection indicates that the remedy is functioning as intended by the ROD and as modified by the ESDs. The disposal of commingled lead and PCB contaminated soil in appropriate landfills, the incineration of high concentration PCB soils along with the capping and consolidation of lesser PCB contaminated soils in a fenced area has achieved the remedial action objectives of preventing direct contact with, or ingestion of, contaminants in soil for Operable Units 2 and 3. The implementation of institutional controls through the Declaration of Restrictions and Covenants and the Affidavit Concerning Real Property Contaminated with Hazardous Substances, has prevented exposure to, or ingestion of, contaminated soil to date. However, in order for the remedy to be protective in the long-term, an Institutional Control Evaluation will be prepared to evaluate the adequacy of the institutional controls in the long term, which will include an evaluation of any encumbrances on the title and also an evaluation whether procedures, such as regular inspections, are in place to ensure long term stewardship.

For Operable Unit 1, the pump and treatment system that was constructed in 1987 was shutdown on October 30, 1991. The system was implemented in order to improve the performance of the Site remedy. The ground water contamination in monitoring wells was found to be below federal MCLs and State standards for individual compounds, as well as, State cumulative standards for multiple VOCs. The rural water supply system continues to provide safe drinking water to area residents. The remedial action objective to minimize the migration of contaminants to groundwater and surface water has been achieved.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

YES

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considereds

Operable Unit 1

The primary contaminants of concern in groundwater are chloroform and trichloroethylene (TCE). The federal standard (MCLs) for TCE remains unchanged at 5 ug/l. Chloroform is included in a standard for a group of chemicals called Trihalomethanes which are disinfection

byproducts. There are no MCLs for individual chemicals within the group, but the MCL for the entire group is 80 ug/l.

State ground water standards for Site related contaminants have changed since the ROD was issued. Since the time of the ROD, the State of Minnesota replaced the Recommended Allowable Limit (RAL) standard with a new standard called Health Risk Limits (HRLs). The HRLs are calculated using the same methodology as for the (RALs), which were advisory levels MDH used before the HRL rules were promulgated. HRLs apply to private ground water drinking water wells only. Since most drinking water wells in the area surrounding area are residential, this ARAR is used to evaluate the risk of human consumption of water associated with this operable unit.

The HRL for chloroform, the predominant volatile organic contaminant of concern in the site groundwater, is 60 ug/l. The site cleanup level was the RAL, which was 57 ug/l. The highest concentration of chloroform found in monitoring wells was 23 ug/l. The HRL for TCE is 30 ug/l, although the MDH recommends using 5 ug/l in response to U.S. EPA's draft health risk assessment that has been prepared for TCE. TCE was the other volatile organic contaminant of concern found in the monitoring wells. TCE was found in one monitoring well at a concentration of 2.6 ug/l, which is below the 5 ug/l level. Since the concentrations of the contaminants of concern in site groundwater are below current federal and state standards, the groundwater remedy is still protective.

Operable Unit 2

RCRA establishes requirements for removal of waste residues and soil contaminated with hazardous waste such as lead. RCRA also specifies requirements for landfills that accept RCRA hazardous waste such as lead. As stated in the ROD, the soil clean-up requirement for lead was 1,000 ppm. This concentration was selected because Site soil contaminated with lead at concentrations below this level and tested with the extraction procedure toxicity leach test did not qualify as RCRA hazardous waste (was below 5 ppm lead), but concentrations above this level did. Release sampling indicated that the highest concentration of lead remaining in soil outside of the GUE Deep was 669 ppm, with most release sampling results below 100 ppm lead. Recent U.S. EPA guidance has established a soil screening level of 800 ppm for lead at commercial/industrial sites. This screening level is not a suggested cleanup level and is a very conservative number used to determine if a site may be contaminated. Since the highest level of lead contaminated soil remaining at the site (669 ppm) is below the soil screening level, the remedy remains protective at Operable Unit 2.

Operable Unit 3

The cleanup of Operable Unit 3 PCB contaminated soils was based on the 40 CFR Part 761, Polychlorinated Biphenyls Spill Cleanup Policy; Final Rule, dated April 2, 1987. This rule presented the TSCA policy for the cleanup of spilled PCBs. It established the measures which

U. S. EPA considered to be adequate cleanup for the majority of situations where PCB contamination occurred during activities regulated under TSCA. The Site clean-up level for PCBs in soil of 10 parts per million (PPM) with a soil cover of 10 inches over the 10 ppm soils, was chosen based on this rule.

In 1998, U.S. EPA published 40 CFR Parts 750 and 761, Disposal of Polychlorinated Biphenyls (PCBs); Final Rule. These regulations established cleanup levels for "high occupancy areas" of 1 ppm or 10 ppm, if the 10 ppm soil is capped with a 10 inch soil cover. Examples of "high occupancy areas" would be residences, schools, a day care center or a single or multiple occupancy 40 hours per week work station. Since the site cleanup levels meets the latter criteria in the 1998 regulations, the Operable Unit 3 soil cleanup for PCBs remains protective.

Changes in Exposure Pathways, Toxicity and Other Contaminant Characteristics

No new exposure pathways have been discovered at the University of Minnesota Site. U.S. EPA is performing a new risk assessment for TCE on a national basis. After this risk assessment is completed, the current groundwater cleanup level for TCE of 5 ug/l will be evaluated to assure that it remains protective.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

NO

As discussed above, during the site inspection, the MPCA raised the question of the location of additional areas in the vicinity of the currently capped Burn Pit subsite where the University may have also disposed of and/or burned laboratory chemicals. The clay cap that was constructed over the Burn Pit subsite was constructed in 1980. Since the capping of the Burn Pit was completed many years prior to the 1990 ROD, it was not part of the remedy selected in the ROD. Also, the investigation of the Burn Pit area occurred in the 1970s and therefore, information regarding investigation of this area is not readily accessible. Since it has been almost 30 years since this area was investigated and the clay cap was constructed, it is recommended that additional file search be done to determine the extent of investigation that was done in this area. After this information is reviewed, a determination can be made at that time whether the protectiveness of the remedy is affected.

Technical Assessment Summary

According to the data reviewed, the site inspection, and interviews with University of Minnesota staff, the remedy is functioning as intended by the ROD and as modified by the ESDs.

For Operable Unit 1, the pump and treatment system that was constructed in 1987 was shutdown on October 30, 1991. The ground water contamination in monitoring wells was found to be

below federal MCLs and State standards for individual compounds, as well as, State cumulative standards for multiple VOCs. The rural water supply system continues to provide safe drinking water to area residents. The remedial action objective to minimize the migration of contaminants to groundwater and surface water has been achieved. The current site groundwater cleanup goal for TCE will be evaluated when U. S. EPA Headquarters completes its national risk assessment for TCE.

The disposal of commingled lead and PCB contaminated soil in appropriate landfills, the incineration of high concentration PCB soils along with the capping and consolidation of lesser PCB contaminated soils in a fenced area has achieved the remedial action objectives of preventing direct contact with, or ingestion of, contaminants in soil for Operable Units 2 and 3. The remedy for Operable Units 2 and 3 also complies with current guidance and regulations for cleanup levels for lead and PCBs in soils. The implementation of institutional controls has prevented exposure to, or ingestion of, contaminated soil to date. However, in order for the remedy to be protective in the long-term, an Institutional Control Evaluation will be prepared to evaluate the adequacy of the institutional controls in the long term, which will include an evaluation of any encumbrances on the title and also an evaluation whether procedures, such as regular inspections, are in place to ensure long term stewardship.

VIII. Issues

Table 4 - Issues

Issues	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Assess adequacy of institutional controls contained in the Declaration of Restrictive Covenants and Affidavit Concerning Real Property Contaminated with Hazardous Substances which have been recorded for Parcel A (GUE Deep), Parcel B (GUE Shallow), Parcel C (UST), Parcel D (Burn Pit) and Parcel E (PE) and assess adequacy of plans in-place to ensure long term stewardship.	N	Y
Long-term stewardship must be ensured which includes maintaining and monitoring effective ICs.	N	Y
Protectiveness of current groundwater cleanup goal for TCE.	N	Y
Clarify whether all locations where the University burned or disposed of chemicals in the Burn Pit area vicinity have been sufficiently addressed.	N	Y
Issues noted from site inspection observations.	N	Y

IX. Recommendations and Follow-Up Actions

Table 5- Recommendations and Follow-Up Actions

Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone	Affects Protectiveness? (Y/N)	
					Current	Future
Assess adequacy of institutional controls	An Institutional Control Evaluation will be conducted * See Below	UM	U.S EPA	December 2007	N	Y
Ensure adequacy of ICs and plan for long-term stewardship of the Site	An Institutional Control Plan will be developed. The Plan will incorporate the results of the evaluation activities and plan for additional IC activities as needed including planning for long- term stewardship	U.S. EPA	U.S. EPA	June 2008	N	Y
Protectiveness of current groundwater cleanup goals for TCE	Reevaluate protectiveness after EPA Headquarters completes risk assessment for TCE	MPCA/ U.S.EPA	MPCA/ U.S. EPA	June 2008	N	Y
Clarification of extent of contamina-tion in the vicinity of the Burn Pit subsite.	A file search should be performed of the multiple locations where the University may have burned or disposed of chemicals. This review should evaluate the sampling performed and determine whether any follow-up actions may be required.	UM	MPCA/ U.S. EPA	December 2007	N	Y

Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone	Affects Protectiveness? (Y/N)	
					Current	Future
Site Inspection Issues	** See Below	UM	MPCA/EPA	December 2007	N	Y

* The Institutional Control Evaluation will include: 1.) An evaluation of the title for prior in-time encumbrances, 2.) Correction of the Declaration of Restrictions and Covenants for The Porter Electric (PE) subsite to state 1 ppm PCBs have been left in place rather than 3.5 ppm PCB concentration remaining, and 3.) An evaluation to determine whether procedures are in place to ensure long-term stewardship such as regular site inspection of ICs at the site and annual certification to EPA that ICs are in place and any other necessary measures.

** 1.) The boundaries of the GUE Shallow, PE and UST subsites should be marked. 2.) All abandoned monitoring wells should be evaluated to assure the wells were abandoned in accordance with the Minnesota Department of Health well code. 3.) The damaged areas of the GUE Deep fence need to be prepared. 4.) New signs with hazardous waste warning language. should be placed on the GUE Deep fence.

X. PROTECTIVENESS STATEMENTS

Operable Unit 1

The Operable Unit 1 remedy is functioning as intended and is protective of human health and the environment because cleanup levels are below the current risk level and there is no current or potential exposure. The ground water contamination in monitoring wells was found to be below federal MCLs, State standards for individual compounds, and State cumulative standards for multiple VOCs. Therefore, the pump and treatment system that was constructed in 1987 was shut down on October 30, 1991. The rural water supply system continues to provide safe drinking water to area residents. The remedial action objective to minimize the migration of contaminants to groundwater and surface water has been achieved. The current site groundwater cleanup goal for TCE will be evaluated when U. S. EPA Headquarters completes its National risk assessment for TCE.

Operable Unit 2

The Operable Unit 2 remedy is functioning as intended and is protective of human health and the environment in the short-term. The cleanup of lead contaminated soils was completed in 1993. Lead contaminated soil was excavated and disposed of in an off-site landfill. Commingled lead and PCB contaminated soil was disposed of in appropriate landfills. The lead contamination soil cleanup complies with current guidance for lead cleanup levels in soils. The cleanup of lead contaminated soils has achieved the remedial action objectives of preventing direct contact with, or ingestion of, lead in soil for Operable Units 2. The implementation of institutional controls has prevented exposure to, or ingestion of, contaminated soil to date. However, in order for the remedy to be protective in the long-term, an Institutional Control Evaluation will be prepared to evaluate the adequacy of the institutional controls in the long term, which will include an evaluation of any encumbrances on the title and also an evaluation of whether procedures, such as regular inspections, are in place to ensure long term stewardship. Additionally, an Institutional Control Plan should be developed that incorporates the Institutional Control Evaluation, and, if necessary, implement corrective measures.

Operable Unit 3

The Operable Unit 3 remedy is functioning as intended and is protective of human health and the environment in the short-term. The cleanup of PCB contaminated soils was completed in 1994. Soils with high concentrations of PCBs were incinerated. Soils with lesser PCB contaminations were consolidated and capped in a fenced area. The PCB contamination soil cleanup complies with current guidance for PCB cleanup levels in soils. The cleanup of PCB contaminated soils has achieved the remedial action objectives of preventing direct contact with, or ingestion of, PCBs in soil for Operable Unit 3. The implementation of institutional controls has prevented exposure to, or ingestion of, contaminated soil to date. However, in order for the remedy to be protective in the long term, an Institutional Control Evaluation will be prepared to evaluate the adequacy of the institutional controls in the long term, which will include an evaluation of any encumbrances on the title, a correction of the Declaration of the Restrictions and Covenants for the PE subsite and also an evaluation whether procedures, such as regular inspections, are in place to ensure long term stewardship. Additionally, an Institutional Control Plan should be developed that incorporates the Institutional Control Evaluation, and, if necessary, implement corrective measures.

Overall Site Protectiveness

Overall, the site remedy is functioning as intended and is protective of human health and the environment in the short-term, however, in order for the remedy to be protective in the long-term, the following actions will need to be taken. A review of the protectiveness of the current groundwater cleanup goal for TCE will be performed after U.S. EPA Headquarters completes its national risk assessment. Effective ICs must be implemented and maintained. An Institutional Control Evaluation will be conducted by the University of Minnesota to evaluate the adequacy of

the ICs to ensure they are functioning as intended and to ensure effective procedures are in-place for long-term stewardship at the Site. An Institutional Control Plan will be developed by U.S. EPA to incorporate the results of IC evaluation activities and, if necessary, plan for additional IC activities such as implementing additional or corrective measures, along with developing a plan to ensure long-term stewardship of the Site that includes regular site inspections and maintaining, monitoring and certifying the ICs at the Site. A review of sampling which was performed for multiple areas in the vicinity of the Burn Pit subsite shall be performed to ensure that no additional actions are necessary in these areas. Finally, maintenance issues identified in the site inspection should be implemented.

XI. Next Review

The next five-year review for the University of Minnesota Rosemount Research Center Site is required five years from the signature date of this review.

Attachment 1
University of Minnesota Rosemount Research Center Site
Five -Year Review
Documents Reviewed

Record of Decision, MPCA/U.S. EPA, June 29, 1990

First Explanation of Significant Differences, MPCA/U.S. EPA, August 1991

Second Explanation of Significant Differences, MPCA/U.S. EPA, October 1993

First Five-Year Review, MPCA, June 6, 1997

Second Five Year Review, MPCA, June 21, 2002

University of Minnesota Rosemount Research Center Final Closeout Report, MPCA June 16, 1996

Interim Response Action Final Report, IT Corporation, January 7, 1994

Response Action Final Report, IT Corporation, August 18, 1994

2001-2002 Groundwater Monitoring Results, Delta Environmental Consultants, February 28, 2002

Declaration of Restrictions and Covenants, University of Minnesota, January 3, 2000

Affidavit Concerning Real Property Contaminated With Hazardous Substances, University of Minnesota, November 5, 1999

Federal Register, 40 CFR Parts 750 and 761, Disposal of Polychlorinated Biphenyls (PCBs); Final Rule, U.S. EPA, June 29, 1998

Attachment 2

Site Maps

Institutional Control (IC) Review
Areas Depicting Implemented Institutional Controls

Superfund
U.S. Environmental Protection Agency

University of Minnesota (Rosemount Research Center)
Dakota County, MN

MND980613780

Legend

Implemented Institutional Controls:

- Restricted Access Parcel A* - GUE Deep Site
- Restricted Parcel B* - GUE Shallow Site
- Restricted Parcel C* - US Transformer Site
- Restricted Parcel D* - Burn Pit Site
- Restricted Parcel E* - Porter Electric and Machine Site

0 500 1,000
Feet

N

GEOS
Groundwater Evaluation and Optimization System

* *See the University of Minnesota Declaration of Restrictions and Covenants (2000) for restriction details*

EPA Disclaimer: Please be advised that areas depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at any time.

Figure 3

Created by Sarah Backhouse
U.S. EPA Region 5 on 3/15/2006
Image Date: 2003

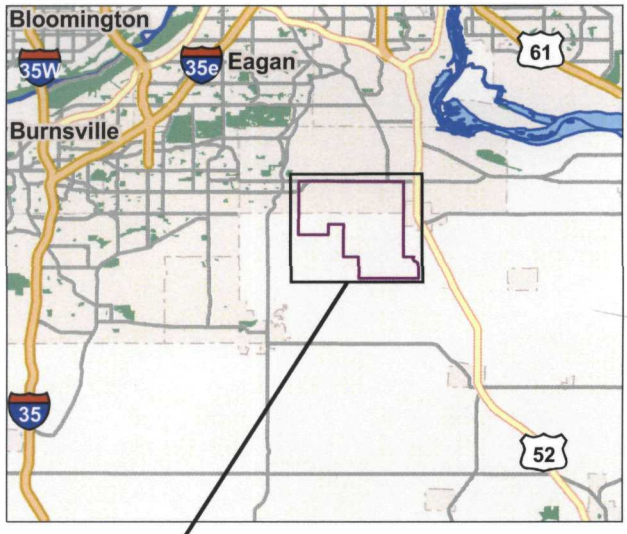
Site Location

Superfund
U.S. Environmental Protection Agency

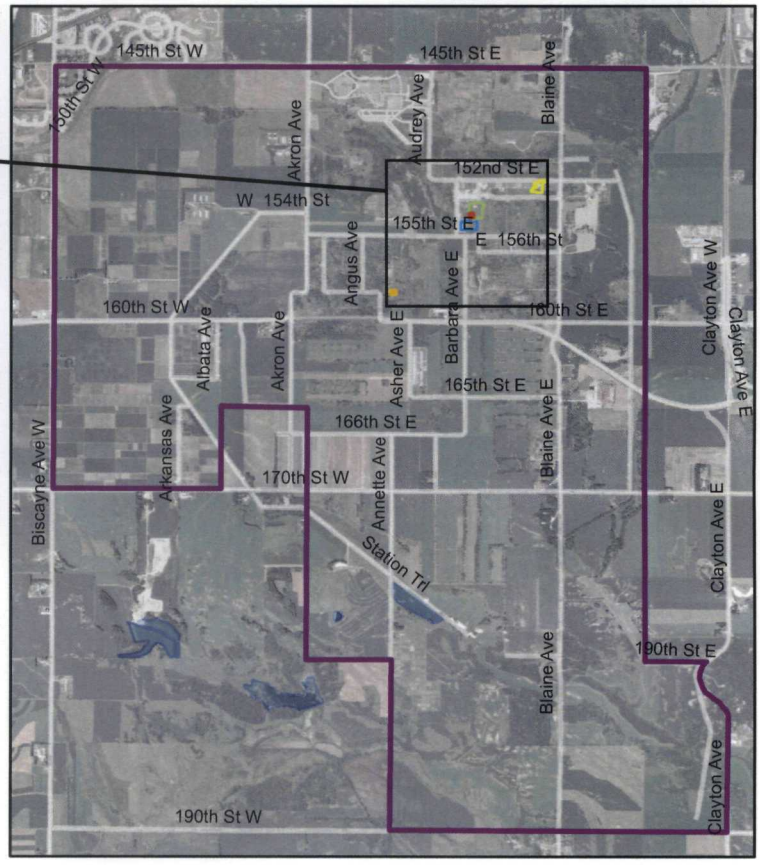
University of Minnesota (Rosemount Research Center)
Dakota County, MN

MND980613780

State



County



Site

Legend

- Rosemount Research Center
- GUE Deep Site
- GUE Shallow Site
- US Transformer Site
- Burn Pit Site
- Porter Electric and Machine Site

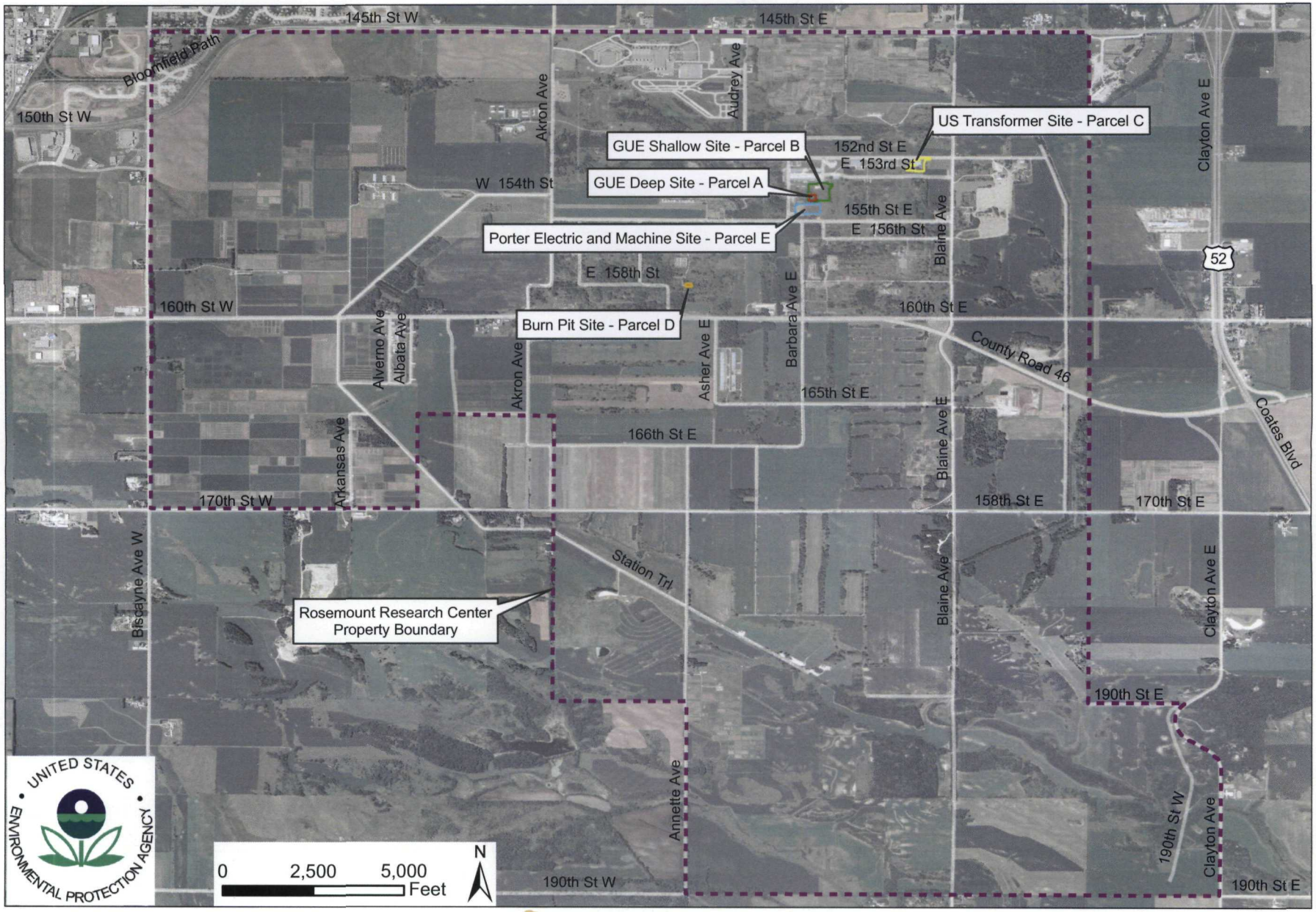
Produced by Sarah Backhouse
U.S. EPA Region 5 on 4/19/07
Image Date: 2003

Figure 1

N

GEOS
Groundwater Evaluation and Optimization System

University of Minnesota (Rosemount Research Center)
Restricted Properties



Created by Sarah Backhouse
U.S. EPA Region 5 on 2/10/2006

Figure 2

EPA Disclaimer: Please be advised that areas depicted in the map have been estimated. The map does not create any rights enforceable by any party. EPA may refine or change this data and map at any time.

Attachment 3

Site Inspection Checklist and Photos

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

(Working document for site inspection. Information may be completed by hand and attached to the Five-Year Review report as supporting documentation of site status. "N/A" refers to "not applicable.")

Rosemount Research Center I. SITE INFORMATION	
Site name: University of MN	**Date of inspection:** 5/17/07
Location and Region: Rosemount MN, Reg V	**EPA ID:** MND 980613780
Agency, office, or company leading the five-year review: U.S. EPA	**Weather/temperature:** Sunny, 80°

Remedy Includes: (Check all that apply)

- G Landfill cover/containment
- G Access controls
- (G) Institutional controls
- G Groundwater pump and treatment
- G Surface water collection and treatment
- G Monitored natural attenuation
- G Groundwater containment
- G Vertical barrier walls
- (G) Other Remediated soils at GUE, PE and UST subsites, Clay cover on Burn Pit subsite.

Attachments: (G) Inspection team roster attached See 5yr rvw G Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____ _____ _____
   Name Title Date
   Interviewed G at site G at office G by phone Phone no. _____
   Problems, suggestions; G Report attached _____
   _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed G at site G at office G by phone Phone no. _____
   Problems, suggestions; G Report attached _____
   _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; G Report attached _____

4. **Other interviews** (optional) G Report attached.

Mr. Gordon Girtz, University of Minnesota
See Mr. Girtz statements which are contained in the 5-year review report.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

G O&M manual	G Readily available	G Up to date	G N/A
G As-built drawings	(G) Readily available	G Up to date	G N/A
G Maintenance logs	G Readily available	G Up to date	G N/A

Remarks Mr. Girtz provided survey drawings which allowed us to locate subsite perimeters.

2. **Site-Specific Health and Safety Plan** G Readily available G Up to date (G N/A)
   G Contingency plan/emergency response plan G Readily available G Up to date (G N/A)
   Remarks

3. **O&M and OSHA Training Records** G Readily available G Up to date (G N/A)
   Remarks

4. **Permits and Service Agreements**

G Air discharge permit	G Readily available	G Up to date	(G N/A)
G Effluent discharge	G Readily available	G Up to date	(G N/A)
G Waste disposal, POTW	G Readily available	G Up to date	(G N/A)
G Other permits	G Readily available	G Up to date	(G N/A)

   Remarks

5. **Gas Generation Records** G Readily available G Up to date G N/A
   Remarks

6. **Settlement Monument Records** G Readily available G Up to date (G N/A)
   Remarks

7. **Groundwater Monitoring Records** G Readily available G Up to date (G N/A)
   Remarks

8. **Leachate Extraction Records** G Readily available G Up to date (G N/A)
   Remarks

9. **Discharge Compliance Records**

G Air	G Readily available	G Up to date	(G N/A)
G Water (effluent)	G Readily available	G Up to date	(G N/A)

   Remarks

10. **Daily Access/Security Logs** G Readily available G Up to date (G N/A)
    Remarks

IV. O&M COSTS

1. **O&M Organization**
   G State in-house G Contractor for State
   ● PRP in-house G Contractor for PRP
   G Federal Facility in-house G Contractor for Federal Facility
   G Other University has incurred nominal costs for annual maintenance

2. **O&M Cost Records** NA
   G Readily available G Up to date
   G Funding mechanism/agreement in place
   Original O&M cost estimate_____ G Breakdown attached

   Total annual cost by year for review period if available

   From_____ To_____ _____ G Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ G Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ G Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ G Breakdown attached
   Date Date Total cost
   From_____ To_____ _____ G Breakdown attached
   Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period** NA
   Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS G Applicable G N/A

A. Fencing

1. **Fencing damaged** Yes ● Location shown on ~~site map~~ Photos G Gates secured G N/A
   Remarks ● GUE Deep is the only fenced area. Repairs need to be made in 2 locations.

B. Other Access Restrictions

1. **Signs and other security measures** Yes G Location shown on site map G N/A
   Remarks Signs need replacement. New signs should also indicate hazardous wastes are present

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — G Yes ● No G N/A
Site conditions imply ICs not being fully enforced — G Yes ● No G N/A

Type of monitoring (e.g., self-reporting, drive by) Drive By
Frequency Infrequent
Responsible party/agency U of M
Contact Mr. Gordon Girtz (Name) Univ of Mn (Title) — (Date) ____ (Phone no.)

Reporting is up-to-date — G Yes G No G (N/A)
Reports are verified by the lead agency — G Yes G No G (N/A)

Specific requirements in deed or decision documents have been met — G Yes G (No) G N/A
Violations have been reported — G Yes G (No) G N/A
Other problems or suggestions: G Report attached

2. **Adequacy** (G) ICs are adequate G ICs are inadequate G N/A
Remarks Five-Year review recommends the U of M perform an evaluation of ICs to ensure long-term stewardship, including regular inspections.

D. General

1. **Vandalism/trespassing** G Location shown on site map (G) No vandalism evident
Remarks

2. **Land use changes on site** G N/A
Remarks Future land use is possible

3. **Land use changes off site** G N/A
Remarks Rosemount area continues to develop which may lead to development on the UMRRC Site

VI. GENERAL SITE CONDITIONS

A. Roads G Applicable G N/A

1. **Roads damaged** G Location shown on site map (G) Roads adequate G N/A
Remarks

B. Other Site Conditions

Remarks

VII. LANDFILL COVERS G Applicable G N/A

A. Landfill Surface Burn Pit subsite (Not a landfill)

1. **Settlement** (Low spots) G Location shown on site map ● Settlement not evident
   Areal extent____ Depth____
   Remarks

2. **Cracks** G Location shown on site map ● Cracking not evident
   Lengths____ Widths____ Depths____
   Remarks

3. **Erosion** G Location shown on site map ● Erosion not evident
   Areal extent____ Depth____
   Remarks Minor erosion repaired prior to inspection

4. **Holes** G Location shown on site map ● Holes not evident
   Areal extent____ Depth____
   Remarks

5. **Vegetative Cover** G Grass ● Cover properly established G No signs of stress
   G Trees/Shrubs (indicate size and locations on a diagram)
   Remarks

6. **Alternative Cover (armored rock, concrete, etc.)** ● N/A
   Remarks

7. **Bulges** G Location shown on site map ● Bulges not evident
   Areal extent____ Height____
   Remarks

8. **Wet Areas/Water Damage** ☒ Wet areas/water damage not evident
   - G Wet areas — G Location shown on site map — Areal extent_____
   - G Ponding — G Location shown on site map — Areal extent_____
   - G Seeps — G Location shown on site map — Areal extent_____
   - G Soft subgrade — G Location shown on site map — Areal extent_____

   Remarks_____

9. **Slope Instability** G Slides G Location shown on site map ☒ No evidence of slope instability
   Areal extent_____
   Remarks_____

B. Benches G Applicable ☒ N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** G Location shown on site map G N/A or okay
   Remarks_____

2. **Bench Breached** G Location shown on site map G N/A or okay
   Remarks_____

3. **Bench Overtopped** G Location shown on site map G N/A or okay
   Remarks_____

C. Letdown Channels G Applicable ☒ N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** G Location shown on site map G No evidence of settlement
   Areal extent_____ Depth_____
   Remarks_____

2. **Material Degradation** G Location shown on site map G No evidence of degradation
   Material type_____ Areal extent_____
   Remarks_____

3. **Erosion** G Location shown on site map G No evidence of erosion
   Areal extent_____ Depth_____
   Remarks_____

4. **Undercutting** G Location shown on site map G No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ G No obstructions
G Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
G No evidence of excessive growth
G Vegetation in channels does not obstruct flow
G Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations G Applicable ● N/A

1. **Gas Vents** G Active G Passive
G Properly secured/lockedG Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance
G N/A
Remarks_____

2. **Gas Monitoring Probes**
G Properly secured/lockedG Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
G Properly secured/lockedG Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

4. **Leachate Extraction Wells**
G Properly secured/lockedG Functioning G Routinely sampled G Good condition
G Evidence of leakage at penetration G Needs Maintenance G N/A
Remarks_____

5. **Settlement Monuments** G Located G Routinely surveyed G N/A
Remarks_____

E. Gas Collection and Treatment G Applicable ● N/A

1. **Gas Treatment Facilities**
   G Flaring G Thermal destruction G Collection for reuse
   G Good condition G Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   G Good condition G Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   G Good condition G Needs Maintenance G N/A
   Remarks_____

F. Cover Drainage Layer G Applicable ● N/A

1. **Outlet Pipes Inspected** G Functioning G N/A
   Remarks_____

2. **Outlet Rock Inspected** G Functioning G N/A
   Remarks_____

G. Detention/Sedimentation Ponds G Applicable ● N/A

1. **Siltation** Areal extent_____ Depth_____ G N/A
   G Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   G Erosion not evident
   Remarks_____

3. **Outlet Works** G Functioning G N/A
   Remarks_____

4. **Dam** G Functioning G N/A
   Remarks_____

H. Retaining Walls G Applicable ● N/A

1. **Deformations** G Location shown on site map G Deformation not evident
   Horizontal displacement_____ Vertical displacement_____
   Rotational displacement_____
   Remarks_____

2. **Degradation** G Location shown on site map G Degradation not evident
   Remarks_____

I. Perimeter Ditches/Off-Site Discharge G Applicable G N/A

1. **Siltation** G Location shown on site map G Siltation not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Vegetative Growth** G Location shown on site map G N/A
   G Vegetation does not impede flow
   Areal extent_____ Type_____
   Remarks_____

3. **Erosion** G Location shown on site map G Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Discharge Structure** G Functioning G N/A
   Remarks_____

VIII. VERTICAL BARRIER WALLS G Applicable ● N/A

1. **Settlement** G Location shown on site map G Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Performance Monitoring** Type of monitoring_____
   G Performance not monitored
   Frequency_____ G Evidence of breaching
   Head differential_____
   Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES G Applicable ● N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines G Applicable G N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
   G Good condition G All required wells properly operating G Needs Maintenance G N/A
   Remarks_____

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   G Good condition G Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   G Readily available G Good condition G Requires upgrade G Needs to be provided
   Remarks_____

B. Surface Water Collection Structures, Pumps, and Pipelines G Applicable G N/A

1. **Collection Structures, Pumps, and Electrical**
   G Good condition G Needs Maintenance
   Remarks_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
   G Good condition G Needs Maintenance
   Remarks_____

3. **Spare Parts and Equipment**
   G Readily available G Good condition G Requires upgrade G Needs to be provided
   Remarks_____

Note: Pump + Treat system ceased operation in 1991.

C. Treatment System G Applicable ● N/A

1. **Treatment Train** (Check components that apply)
   G Metals removal G Oil/water separation G Bioremediation
   G Air stripping G Carbon adsorbers
   G Filters_____
   G Additive (*e.g.*, chelation agent, flocculent)_____
   G Others_____
   G Good condition G Needs Maintenance
   G Sampling ports properly marked and functional
   G Sampling/maintenance log displayed and up to date
   G Equipment properly identified
   G Quantity of groundwater treated annually_____
   G Quantity of surface water treated annually_____
   Remarks_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   G N/A G Good condition G Needs Maintenance
   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   G N/A G Good condition G Proper secondary containment G Needs Maintenance
   Remarks_____

4. **Discharge Structure and Appurtenances**
   G N/A G Good condition G Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   G N/A G Good condition (esp. roof and doorways) G Needs repair
   G Chemicals and equipment properly stored
   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   G Properly secured/lockedG Functioning G Routinely sampled G Good condition
   G All required wells located G Needs Maintenance G N/A
   Remarks_____

D. Monitoring Data

1. Monitoring Data Clean up goals achieved in 2002. Last monitoring event in 2002.
   G Is routinely submitted on time G Is of acceptable quality

2. Monitoring data suggests:
   G Groundwater plume is effectively contained G Contaminant concentrations are declining

D. Monitored Natural Attenuation NA

1. **Monitoring Wells** (natural attenuation remedy)
G Properly secured/locked G Functioning G Routinely sampled G Good condition
G All required wells located G Needs Maintenance G N/A
Remarks Standing Water found in casing of abandoned monitoring well. see discussion in XI B below

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

Soil cleanup to prevent direct contact - Remediated soils at GUE Shallow, PE & UST subsites are now open fields. Lesser PCB contaminated soils are consolidated at GUE Deep subsite. ICs appear effective to date in limiting exposure at GUE Shallow, PE & UST subsites. Fencing and warning signs appear to prevent access at GUE Deep.

Groundwater cleanup goals have been achieved.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

O&M is generally acceptable. GUE Deep has 2 sections of fence that need repair and also faded warning signs should be replaced. Monitoring wells that were abandoned should be evaluated to ensure they were abandoned in accordance with MDH regulations. The borders of the GUE Shallow, PE and UST subsites should be marked to ensure that ICs can be more easily monitored in the future.

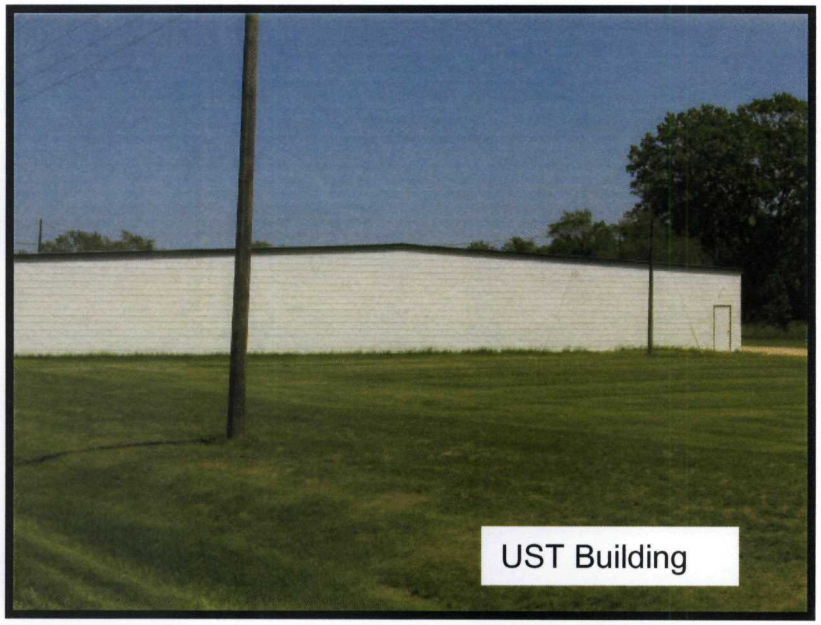
C. Early Indicators of Potential Remedy Problems NA

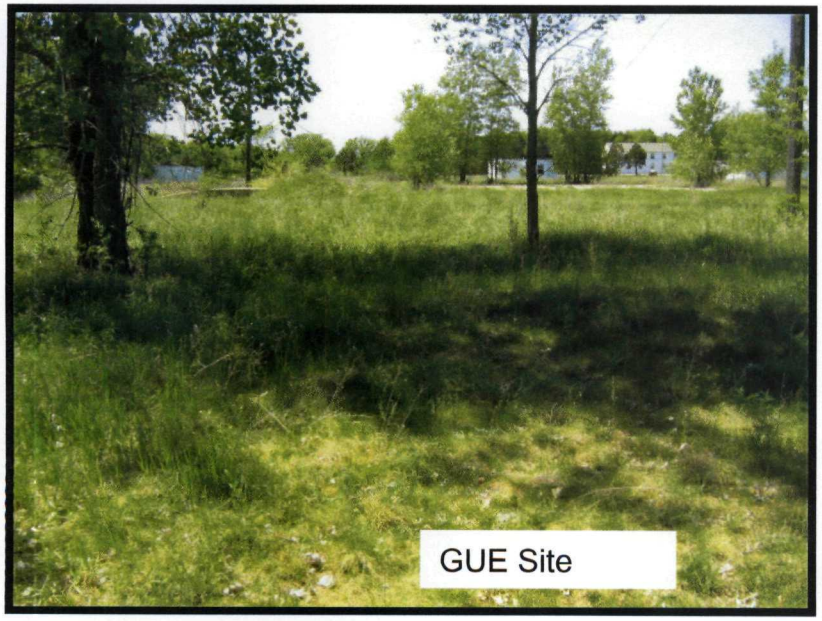
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

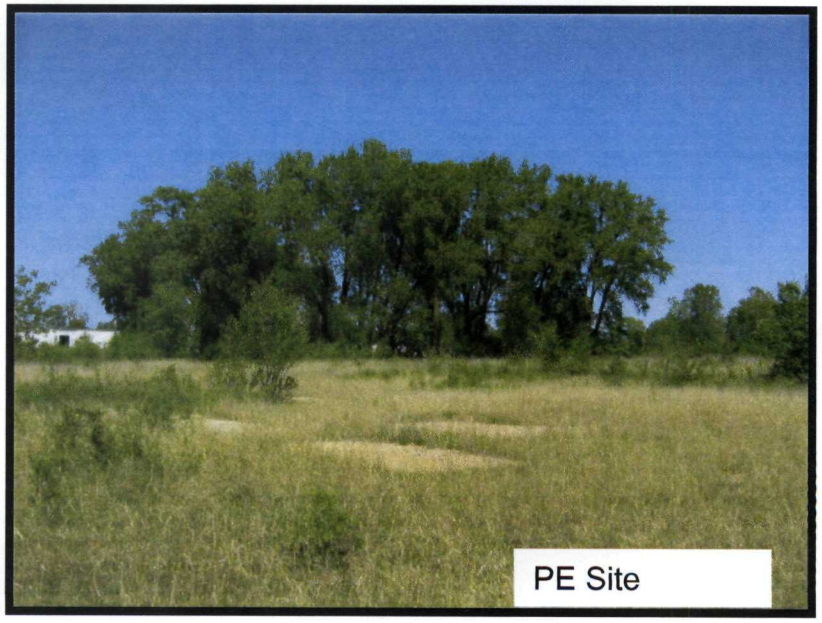
D. Opportunities for Optimization NA

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

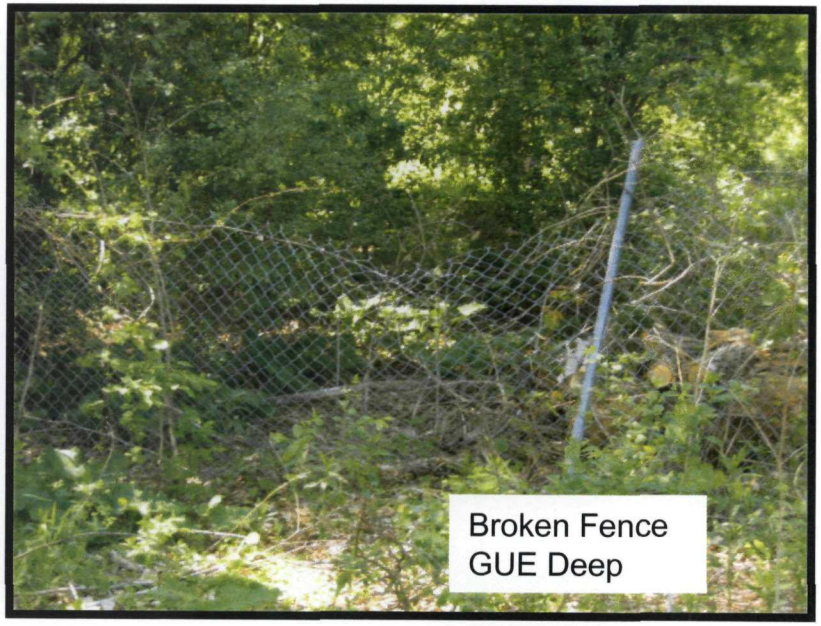

UST Site


UST Building


GUE Site


PE Site

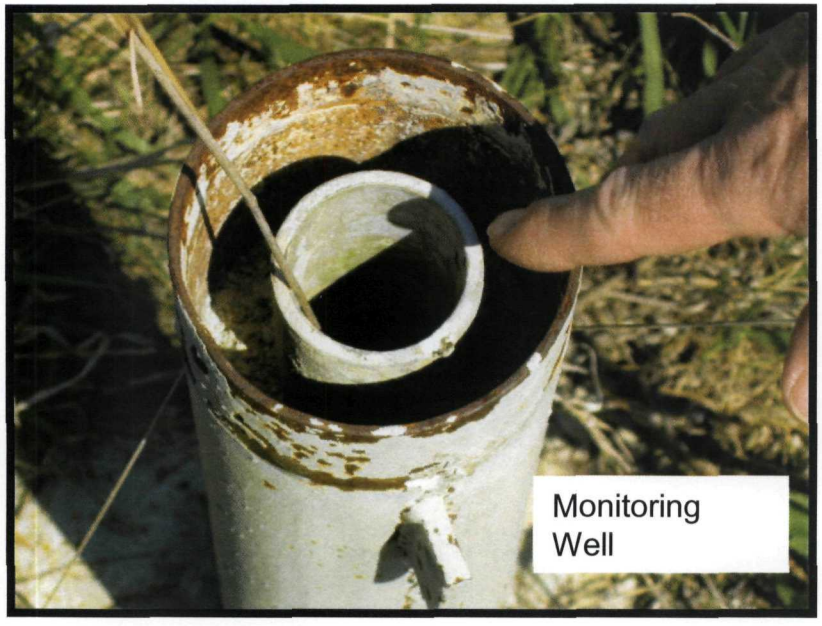
Burn Pit Site



Broken Fence
GUE Deep

Broken Fence
GUE Deep

Warning Sign
GUE Deep


Monitoring
Well

Attachment 4

Public Notice of Start of Five Year Review

United States Environmental Protection Agency Begins Review of the University of Minnesota Rosemount Research Center Superfund Site Rosemount, Minnesota

U.S. Environmental Protection Agency is beginning a third five-year review of the University of Minnesota Rosemount Research Center Superfund site. Superfund law requires reviews of sites where the cleanup is either in progress or completed but hazardous waste remains managed on-site. These five-year reviews ensure the cleanup continues to protect human health and the environment.

A 1990 cleanup decision for the site selected a ground-water pump and treatment system for one section of the property and soil excavation, consolidation, thermal destruction, off-site transport and disposal of contaminated soil, and back-filling of clean soils for two other sections.

Modifications were made to the cleanup decision in late 1991when a PCB thermal incinerator was approved to operate.

In the second five-year review in 2002 EPA found the cleanup continued to be protective of human health and the environment. The Agency further found that hazardous substances, pollutants or contaminants remain at the site which would not allow for unlimited use at the existing level of site cleanup.

EPA invites public comment on this review. You can review documents in the site information repository in the Minnesota Pollution Control Agency, 520 Lafayette Road N., St. Paul.

Direct questions or comments to:

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